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**BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES**

Application Number: 10/678,720
Filing Date: October 03, 2003
Appellant(s): LAM, ROBERT C.

Emch, Schaffer, Schaub & Parcelllo
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed 12/19/2008 appealing from the Office action mailed 8/12/2008.

(1) Real Party in Interest

A statement identifying by name the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

Examiner disagrees with the Appellant statement that there are no related appeals, interferences and judicial proceedings. The following are the related appeals, interferences, and judicial proceedings known to the examiner which may be related to, directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal:

10/678,599 and 10/678,598

(3) Status of Claims

The statement of the status of claims contained in the brief is correct.

(4) Status of Amendments After Final

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

(5) Summary of Claimed Subject Matter

The summary of claimed subject matter contained in the brief is correct.

(6) Grounds of Rejection to be Reviewed on Appeal

The appellant's statement of the grounds of rejection to be reviewed on appeal is correct.

(7) Claims Appendix

The copy of the appealed claims contained in the Appendix to the brief is correct.

(8) Evidence Relied Upon

EP 1203897	Lam	8-2002
EP 0971151	Lam	12-2000
5,965,658	Smith	10-1999

(9) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

Claim 6-9, 12-13 and 29 rejected under 35 U.S.C. 103(a) as being unpatentable over Lam (EP 1203897) in view of Lam (EP 0971151) in further view of Smith (US 5,965,658). Lam '897 teaches a friction material having fibrous base impregnated with a curable resin wherein the fibrous base material comprises a porous primary layer and one secondary layer.

The friction material is comprised of 10-50% of less fibrillated aramid fiber, 10-35% carbon particles, 5-20% cotton fibers, 2-15% carbon fibers and 10-35% filler material (claim 12).

The Canadian Standard Freeness (CSF) index of the aramid fibers is at least 300 (claim 6).

Lam '897 teaches a porous primary layer and friction modifying particles covering 3-90% of the primary layer surface area (claim 1).

Lam '897 teaches friction modifying particles that include silica particles, phenolic resins, silicone resins, epoxy resins and mixtures thereof; fully carbonized carbon powder or particles or partially carbonized powder or particles and mixtures thereof; (claim 5).

Lam '897 teaches friction modifying particles in the secondary layer including carbon particles, aramid fibers coated with carbon particles, carbon particles and a retention aid where the friction material must be resilient or elastic yet resistant to compression set, abrasion and stress, have high heat resistance and be able to dissipate heat quickly (pg 4, lines 10-13).

Lam '897 further teaches fibrillated fibers and carbon fibers that provide a friction material with improved anti-shudder characteristics, high thermal conductivity, porosity strength, and noise resistance (pg 6 lines 5-15). Lam '897 teaches carbon fibers provide friction material with good heat conduction such that the friction material has desired heat resistance (pg 4, lines 10-13).

Lam '897 teaches carbon fibers in the primary layer but differs and does not teach carbon fibers in the secondary layer.

Lam '897 does not teach the carbon fibers are partially carbonized carbon fibers that are 65-90% carbonized.

Lam '151 teaches a two-ply fibrous base material for use in friction material comprising a secondary layer bonded to a primary layer (claim 1). Lam '151 teaches the secondary layer comprises high temperature resistant, high strength fibers such as aramid fibers, carbon fibers, cotton or other cellulose fibers, fillers and/or novoloid fibers and in certain embodiments, carbon particles and/or graphite particles [0018].

Lam '151 teaches the primary layer and secondary layer can comprise the same or different compositions and can both comprise one or more types of fibers, fillers and friction particles [0041].

Lam '151 teaches carbon fibers are useful in the secondary layer and can be present at a range of 5-30% as a percent of the secondary layer [0044].

Smith teaches a non-asbestos friction material and method of making (ABST). Smith teaches carbon fibers and aramid fibers are preferred over asbestos as fiber materials because the carbon and aramid fibers have superior anti-fade properties that provide benefits for friction material applications (col. 2, lines 10-14). Smith teaches carbon fibers and the disadvantages of carbon fibers (col. 2, lines 58-64). Smith teaches the advantages of using carbonaceous fibers in a friction material as an improvement and replacement for carbon fibers. Smith teaches a brake pad comprising 2 to 20% carbonaceous fibers (claim 1). Smith teaches carbonaceous fibers that are 65-80% carbon (ABST). Carbonaceous fibers are equated with partially carbonized fibers.

It further would have been obvious to one of ordinary skill in the art at the time the invention was made to employ carbon fibers in the secondary layer as of Lam '897 motivated to improve the properties of the friction material as taught by Lam '151. It further would have been obvious to one of ordinary skill in the art to employ partially carbonized fibers of Smith as a substitute of the friction fibers and particles of Lam, motivated to improve the properties of the friction material.

As to claim 7 Lam '897 teaches a less fibrillated aramid fibers of about 430 to 650 on Canadian Standard Freeness index in claim 1.

As to claim 8, Lam '897 teaches a less fibrillated aramid fibers of average fiber lengths in the range of 0.5 to 10 mm in claim 19.

As to claim 9, Lam '897 teaches a filler of diatomaceous earth in claim 20.

As to claim 12, Lam '897 teaches a friction material is comprised of 10-50% of less fibrillated aramid fiber, 10-35% carbon particles, 5-20% cotton fibers, 2-15% carbon fibers and 10-35% filler material in claim 21.

As to claim 13, Lam '897 teaches a friction material is comprised of 38 to 40% of less fibrillated aramid fiber, 13-15% carbon particles, 10-12% cotton fibers, 4-6% carbon fibers and 28-30% filler material in claim 22.

As to claim 29, Lam '897 teaches carbon fibers in the primary layer. Smith teaches partially carbonized fibers are an improvement and can be substituted for carbon fibers. Smith teaches employing partially carbonized fibers at 2-20% of the friction material. Smith teaches the partially carbonized fibers are 65-80% carbonized. It would have been obvious to one of ordinary skill in the art at the time the invention was made to employ partially carbonized fibers in the primary layer.

The terminal disclaimer filed on 11/07/2006 disclaiming the terminal portion of any patent granted on this application which would extend beyond the expiration date of 10/678,598 has been reviewed and is accepted. The terminal disclaimer has been recorded.

The terminal disclaimer filed on 5/17/2007 disclaiming the terminal portion of any patent granted on this application which would extend beyond the expiration date of any patent granted on Application No. 10/678,599 has been reviewed and is accepted. The terminal disclaimer has been recorded.

(10) Response to Argument

I. Summary

Appellant states that Lam '897

- does not teach carbon fibers in the secondary layer and
- does not teach the carbon fibers in the secondary layer are partially carbonized carbon fibers that are carbonized to 65-90% and
- does not teach the secondary layer comprises 5% to 35% partially carbonized carbon fibers.

Appellant states that Lam '897 is clearly deficient. Examiner agrees with Appellant and has rejected the claims as being obvious over the combination of Lam '897 and secondary references, Lam '151 and Smith 5,965,658.

Appellant submits that no basis in fact or theory exists for making the numerous modifications need to arrive at the claimed invention and in this case the infinite array of elements with which to start, one would not follow the exact route of the inventor. Appellant argues that if applying a means for solving a problem involves significant trial and error (testing) then a finding of obviousness is not warranted.

The references to Lam '897, Lam '151 and Smith are all in the same field of endeavor directed to producing a material for use as a brake which has the properties of creating friction while dissipating heat and maintaining strength and structural form in a high friction condition. Lam '897 teaches friction modifying particles include silica particles, phenolic resins, silicone resins, epoxy resins, fully carbonized carbon powder

or particles or partially carbonized powder or particles. Lam '897 teaches carbon fibers are useful in the primary layer of the friction material. However Lam '897 teaches carbon powder and partially carbonized carbon powder in the secondary layer and does not teach partially carbonized fibers. Therefore, Lam '151 is relied upon for teaching a friction material where the composition of the primary layer and secondary layers can comprise the same compositions [0041]. Lam '151 continues to state that carbon fibers are useful in the secondary layer [0044] and the carbon fibers can be present at a range of 5% to 30%.

As Lam '897 and Lam '151 teach partially carbonized powders and particles but fail to teach partially carbonized fibers, Smith is relied upon for teaching this claim element. Smith's motivation for substituting partially carbonized fibers for carbon fibers is that carbon fibers provide low friction coefficients which are properties that are disadvantageous to braking and power transmission. Smith continues to state that carbon fibers have the further disadvantage that their high heat conductivity causes increased heat transfer to the support of a friction material or the mating member (col. 2, lines 47-67).

Smith teaches that PAN based carbon fibers contribute to the stabilization of the coefficient of friction of the friction material at high temperatures. Smith teaches the PAN based carbon fibers are partially carbonized to contain bond carbon of 65-80% (col. 4, lines 10-12) and in the claimed range. Smith teaches the coefficient of friction of the partially carbonized fibers is high when compared to conventional carbon fiber products. Smith teaches the partially carbonized fibers are employed in a composition

with thermosetting resins in an amount of 2 to 20% which is also the claimed percentage of partially carbonized fibers in the secondary layer.

Smith teaches a partially carbonized fiber with the claimed percent carbon. Smith employs the partially carbonized fiber in a composition at the same percentage as the Appellant. Therefore it would have been obvious to substitute the partially carbonized carbon fibers of Smith with the carbon fibers of Lam '151 and Lam '897 and the results of the substitution would have been predictable in improving the friction properties of the friction material.

Based on the teachings of Lam '897, Lam '151 and Smith, one of ordinary skill in the art could have arrived at the claimed composition and structure without significant trial and error as Smith is teaching that partially carbonized fibers are a known substitute for carbon fibers. Further Smith is teaching using the same percentage of fibers in the resin base material. There would have been no need for significant trial and error and testing to arrive at the claimed composition. Therefore, the conclusion that it would have been obvious to combine the teachings of Lam '897, Lam '151 and Smith to arrive at the claimed invention is maintained.

II. Claims 6-9, 12-13 and 29 are patently distinct under 35 USC 103(a) over Lam (EP 1203897) in view of Lam (EP 0971151) in view of Smith (US 5,965,658).

Appellants argue that the conclusion of obviousness of combining Lam '897, Lam '151 and Smith has no basis in fact or theory for making the numerous modifications

needed to arrive at the claimed invention. The rearrangement of parts as suggested by the Examiner is not within the purview of one skilled in the art. Appellants argue that given the infinite array of elements with which to start, one would not follow the exact route of the inventor and the Examiner has not made a showing that one would follow the exact route taken by the inventor.

As stated in the paragraph above, the primary reference to Lam '897 teaches carbon fibers in the primary layer and teaches that carbon fibers are friction modifying particles. While Lam '897 does not teach carbon fibers in the secondary layer, Lam '151 teaches carbon fibers can be used in the primary or secondary layer and the layers can be the same or different compositions. There need for trial and error would be eliminated by Lam '151 that teaches that both layers can have the same or different compositions.

Smith teaches that substituting partially carbonized fibers for carbon fibers produces an improved friction material. One of ordinary skill in the art could have combined the known elements and there would be a reasonable expectation of success in producing a friction material with the improved properties as taught by the references.

Appellant submits that one cannot rely on hindsight reasoning in reaching an obvious determination and it is essential that the decision maker forget what he or she has been taught by the claimed invention. In response to applicant's argument that the examiner's conclusion of obviousness is based upon improper hindsight reasoning, it must be recognized that any judgment on obviousness is in a sense necessarily a reconstruction based upon hindsight reasoning. But so long as it takes into account

only knowledge which was within the level of ordinary skill at the time the claimed invention was made, and does not include knowledge gleaned only from the applicant's disclosure, such a reconstruction is proper. See *In re McLaughlin*, 443 F.2d 1392, 170 USPQ 209 (CCPA 1971).

The prior art references teach the elements and features of the claimed invention and one of ordinary skill in the art could have combined the known features and substituted the partially carbonized fibers for the carbon fibers and carbon particles of Lam '897 and Lam '151 with a reasonable expectation of success. The burden is on the Appellant to provide evidence of an unexpected result that would show that it would not be obvious to combine the known features. Appellant has not presented a showing of evidence either in the claims, arguments or in the form of an affidavit to show that the claimed invention has an unexpected result such as longer life, higher temperature resistance or higher friction factor that would provide a showing of nonobviousness.

Appellant submits that the "common sense" test of KSR and the Federal Circuit's "teaching, suggestion, motivation" test would not teach what is claimed. With respect to Applicant's arguments that there is no suggestion of motivation to combine, the rationale to modify or combine the prior art does not have to be expressly stated in the prior art; the rationale may be expressly or impliedly contained in the prior art or it may be reasoned from knowledge generally available to one of ordinary skill in the art, established scientific principles, or legal precedent established by prior case law. In *re* Fine, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988); *In re* Jones, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992).

The combined references provide the rationale that one of ordinary skill in the art could have combined known friction modifying particles including carbon fibers and partially carbonized fibers in friction material. Smith teaches the advantages of partially carbonized fiber versus carbon fibers and therefore provides motivation to make the substitution of materials from carbon fiber to partially carbonized fibers. Lam '897 and Lam '151 teach layered structures with a primary layer and a secondary layer wherein the layers can be the same or different compositions and can include carbon fibers and partially carbonized powders or particulates.

Appellants argue that Smith does not teach carbon fibers in the secondary layer. Smith is not relied upon for teaching a two layer structure; Lam '897 and Lam '151 are relied upon for teaching a two layer structure. Smith is relied upon for teaching the advantages of substituting partially carbonized fibers for carbon fibers in a friction material. Smith is teaching that partially carbonized fiber provides an improved result and one of ordinary skill in the art could improve the invention of Lam by substituting the fibers for any of the friction modifying particles, specifically the carbon fibers.

III. Conclusion

Appellants conclude that Lam '897 is deficient and does not teach carbon fibers in the second layer and does not teach partially carbonized fibers in the secondary layer. Appellant restates Lam '151 does not teach partially carbonized fibers and Smith does not teach carbon fibers in the secondary layer. Appellants argue that no basis in fact or theory exists for picking and choosing from Lam '151 and Smith as suggested.

The basis for the rationale to combine the references is found in the references themselves which explicitly teach the following elements: friction materials, friction materials with a primary and secondary layer, carbon fibers can be in the primary and secondary layer and finally that partially carbonized carbon fibers can substituted for carbon fibers to improve the performance of a friction material.

KSR states that the rationale to modify or combine the prior art does not have to be expressly stated in the prior art; the rationale may be expressly or impliedly contained in the prior art or it may be reasoned from knowledge generally available to one of ordinary skill in the art, established scientific principles, or legal precedent established by prior case law. Section 2141 of the MPEP states (1) "In United States v. Adams [t]he Court recognized that when a patent claims a structure already known in the prior art that is altered by the mere substitution of one element for another known in the field, the combination must do more than yield a predictable result." *Id.* at, 82 USPQ2d at 1395.

As the prior art teaches the features and scientific principles that form the basis of the claimed invention, one of ordinary skill in the art could have combined the references and the results of the combination would be obvious, predictable and successful in producing an improved friction material.

(11) Related Proceeding(s) Appendix

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

/Jennifer Steele/

Examiner, Art Unit 1794

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